

PATENT

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Date: 6-15-2005  
Jeffrey R. Sadlowski

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of:

Applicant(s): Steven M. Zink, *et al.*

Examiner: David Wiley

Serial No: 10/092,323

Art Unit: 2100

Filing Date: March 6, 2002

Title: SYSTEM AND METHODOLOGY PROVIDING OPTIMIZED DATA  
EXCHANGE WITH INDUSTRIAL CONTROLLER

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

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**SUPPLEMENTAL DETAILED DISCUSSION OF  
REFERENCES FROM PRE-EXAMINATION SEARCH**

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Dear Sir:

During the pre-examination search, the following references were located:

- (1) US 5,805, 442 (9-8-1998) Crater *et al.*
- (2) US 5,844,794 (12-1-1998) Keeley
- (3) US 5,975,737 (11-2-1999) Crater *et al.*
- (4) US 6,104,875 (8-15-2000) Gallagher *et al.*
- (5) US 6,651,110 (11-18-2003) Caspers *et al.*

10/092,323

02SW049

Applicants' representative respectfully submits that the subject application, as claimed, is patentable over these references individually and/or in combination for at least the reasons discussed below.

### **The Subject Application**

The subject application relates to a system and methodology facilitating network communications between an industrial control system and a client application that interacts with a plurality of data items on the control system. (Abstract.) The client application initiates a request or query to the industrial control system for an identification of selected data items of interest. (Abstract.) Based on information received in the request, an aggregation component can be constructed by the client, wherein names and buffer allocations relating to the data items of interest are provided. (Abstract.) The aggregation component is then installed by the client and updated in the industrial control system, thus providing information access to the client application when fresh or updated information is desired. (Abstract.) Information is accessed *via* a communications packet that is generated from the data items identified in the aggregation component. (Abstract.) Information transmitted to the control system can also be optimized by identifying the information *via* handle identifiers that are employed in place of explicit reference or tag names.

More specifically, independent claim 1 of the subject application is directed to an industrial control system comprising an aggregation component associated with an industrial controller and a communications component. The aggregation component aggregates "one or more selected data items into an aggregated subset of data items". The aggregation component is defined and installed by an entity remote from the controller. The communications component transmits the subset of data items *via* a singular communications packet across a network.

Next, independent claim 21 relates to a method to facilitate data communications with an industrial controller. The method includes requesting tag information from a controller, building an object from the tag information provided by the controller, installing the object on the controller, updating object data on the controller, and, receiving data from the object that has been updated by the controller.

10/092,323

02SW049

Independent claim 31 is directed to a system to facilitate data communications with an industrial controller similar to the method claimed in independent claim 21. The system includes means for requesting tag identifiers from a controller, means for constructing an optimized data packet from the tag identifiers requested from the controller, means for installing the optimized data packet on the controller, means for refreshing the optimized data packet on the controller, and, means for transmitting data from the optimized data packet that has been refreshed by the controller.

Independent claim 32 relates to a signal to facilitate communications between a client application and an industrial controller. The signal includes a data packet including aggregated information relating to one or more data items in an industrial controller, the one or more data items including tag and value information generated from an object installed on the controller, the aggregated information transmitted *via* a singular communications packet to mitigate transmission of superfluous network data.

Finally, independent claim 33 is directed to an industrial controller. As amended in a Preliminary Amendment filed concurrently with this Supplemental Detailed Discussion, the industrial controller includes a first component that processes information received from a remote entity, an aggregation component that employs the information in connection with aggregating one or more selected data items into an aggregated subset of data items, the aggregation component defined and installed by an entity remote from the industrial controller, and, a communications component adapted to transmit the subset of data items *via* a singular communications packet across a network.

Applicants' representative respectfully submits that the subject application as claimed is patentable over each of these references individually and/or in combination for at least the following reasons.

### **Detailed Discussion of References**

#### **I. US 5,805, 442 (9-8-1998) Crater *et al.***

US 5,805,442 (Crater I) relates to a distributed interface architecture for programmable industrial control systems. (Title). The burden of providing user interfaces for changing forms of data is shifted from the monitoring computers to the

10/092,323

02SW049

controllers that actually gather and report the data. (See, Col. 2, lines 40 – 45). The controllers serve as network servers and the monitoring computer functions as a network client. (See, Col. 8, lines 6 – 9). The controller includes means for gathering data relevant to a control function, the data being retrievable by a remotely located computer. (Col. 9, lines 25-29). The controller further includes computer storage means comprising instructions retrievable and executable by the remotely located computer, the instructions being associated with the data and causing the remotely located computer to present the data in a predetermined format. (Col. 9, lines 30-34, emphasis added).

Independent claim 1 of the present application is directed to an industrial control system comprising an aggregation component associated with an industrial controller and a communications component. The aggregation component aggregates “one or more selected data items into an aggregated subset of data items”. The aggregation component is defined and installed by an entity remote from the controller. The communications component transmits the subset of data items *via* a singular communications packet across a network.

Applicants’ representative respectfully submits that Crater I does not teach, suggest or make obvious an industrial controller having an aggregation component that is defined and installed by an entity remote from the controller as required by independent claim 1 of the present application. Further, Crater I does not teach, suggest or make obvious aggregation of one or more selected items into an aggregated subset of data items transmitted *via* a singular communications packet across a network as required by independent claim 1 of the present application.

Next, independent claim 21 relates to a method to facilitate data communications with an industrial controller. The method includes requesting tag information from a controller, building an object from the tag information provided by the controller, installing the object on the controller, updating object data on the controller, and, receiving data from the object that has been updated by the controller. Crater I does not teach, suggest or make obvious building an object from tag information provided by a controller, installing the object on the controller, updating object data on the controller and/or receiving data from the object that has been updated by the controller.

10/092,323

02SW049

Independent claim 31 is directed to a system to facilitate data communications with an industrial controller similar to the method claimed in independent claim 21. The system includes means for requesting tag identifiers from a controller, means for constructing an optimized data packet from the tag identifiers requested from the controller, means for installing the optimized data packet on the controller, means for refreshing the optimized data packet on the controller, and, means for transmitting data from the optimized data packet that has been refreshed by the controller. Crater I does not teach, suggest or make obvious a system comprising means for requesting tag identifiers, means for constructing an optimized data packet from the tag identifiers, means for installing the optimized data packet, means for refreshing the optimized data packet and/or means for transmitting data from the optimized data packet.

Independent claim 32 relates to a signal to facilitate communications between a client application and an industrial controller. The signal includes a data packet including aggregated information relating to one or more data items in an industrial controller, the one or more data items including tag and value information generated from an object installed on the controller, the aggregated information transmitted *via* a singular communications packet to mitigate transmission of superfluous network data. Crater I does not teach, suggest or make obvious a signal to facilitate communications between a client application and an industrial controller, the signal including a data packet including aggregated information relating to data item(s), the data item(s) generated from an object installed on the controller, the aggregated information transmitted via a singular communications packet.

Finally, independent claim 33 is directed to an industrial controller that includes a first component that processes information received from a remote entity, an aggregation component that employs the information in connection with aggregating one or more selected data items into an aggregated subset of data items, the aggregation component defined and installed by an entity remote from the industrial controller, and, a communications component adapted to transmit the subset of data items via a singular communications packet across a network. Crater I does not teach, suggest or make obvious an industrial controller that includes an aggregation component defined and installed an entity remote from the industrial controller that employs information in

10/092,323

02SW049

connection with aggregating data item(s) into an aggregated subset of data items, the subset of data item(s) transmitted *via* a singular communications packet.

## II. US 5,844,794 (12-1-1998) Keeley

US 5,844,794 (Keeley) discloses multiple processing units connected along a communication link to form an industrial controller that may arrange for efficient block transfer of data by isochronous methods by forwarding to a data producer a connection message including the desired data structure having the variables necessary to be transmitted in a predefined order. (Abstract, emphasis added). Upon receipt of the data structure, the data producer may program itself to collect the data into the structure and forward the data on a periodic basis dictated by the connection message to the data consumer. (Abstract). Changes in the data structure may thus be accommodated efficiently in a manner that is invisible to the user. (Abstract).

The processing units of Keeley combine to form an industrial controller. Each module requiring data can identify data required by it and create an arbitrary data structure into which the data can be collected. (Col. 2, lines 44 – 46). The data structure can then be communicated to the data producing module which, working from information provided to it by the data consuming module, can program itself to collect the necessary data and transmit it. (Col. 2, lines 46 – 50).

Independent claim 1 of the present application is directed to an industrial control system comprising an aggregation component associated with an industrial controller and a communications component. The aggregation component aggregates “one or more selected data items into an aggregated subset of data items”. The aggregation component is defined and installed by an entity remote from the controller. The communications component transmits the subset of data items *via* a singular communications packet across a network. It is respectfully submitted that Keeley does not teach, suggest or make obvious an industrial controller having an aggregation component that is defined and installed by an entity remote from the controller as required by independent claim 1 of the present application.

Next, independent claim 21 of the present application relates to a method to facilitate data communications with an industrial controller. The method includes

10/092,323

02SW049

requesting tag information from a controller, building an object from the tag information provided by the controller, installing the object on the controller, updating object data on the controller, and, receiving data from the object that has been updated by the controller. Keeley does not teach, suggest or make obvious building an object from tag information provided by a controller, installing the object on the controller, updating object data on the controller and/or receiving data from the object that has been updated by the controller.

Independent claim 31 is directed to a system to facilitate data communications with an industrial controller similar to the method claimed in independent claim 21. The system includes means for requesting tag identifiers from a controller, means for constructing an optimized data packet from the tag identifiers requested from the controller, means for installing the optimized data packet on the controller, means for refreshing the optimized data packet on the controller, and, means for transmitting data from the optimized data packet that has been refreshed by the controller. Keeley does not teach, suggest or make obvious a system comprising means for requesting tag identifiers, means for constructing an optimized data packet from the tag identifiers, means for installing the optimized data packet, means for refreshing the optimized data packet and/or means for transmitting data from the optimized data packet.

Independent claim 32 relates to a signal to facilitate communications between a client application and an industrial controller. The signal includes a data packet including aggregated information relating to one or more data items in an industrial controller, the one or more data items including tag and value information generated from an object installed on the controller, the aggregated information transmitted via a singular communications packet to mitigate transmission of superfluous network data. Keeley does not teach, suggest or make obvious a signal to facilitate communications between a client application and an industrial controller, the signal including a data packet including aggregated information relating to data item(s), the data item(s) including tag and value information generated from an object installed on the controller.

Finally, independent claim 33 is directed to an industrial controller that includes a first component that processes information received from a remote entity, an aggregation component that employs the information in connection with aggregating one or more

10/092,323

02SW049

selected data items into an aggregated subset of data items, the aggregation component defined and installed by an entity remote from the industrial controller, and, a communications component adapted to transmit the subset of data items via a singular communications packet across a network. Keeley does not teach, suggest or make obvious an industrial controller that includes an aggregation component defined and installed by an entity remote from the industrial controller that employs information in connection with aggregating data item(s) into an aggregated subset of data items, the subset of data item(s) transmitted via a singular communications packet.

**III. US 5,975,737 (11-2-1999) Crater et al.**

US 5,975,737 (Crater II) is a continuation application of Crater I. For at least the reasons discussed previously with respect to Crater I, the subject invention is patentable over Crater II.

**IV. US 6,104,875 (8-15-2000) Gallagher et al.**

US 6,104,875 (Gallagher) relates to a method for field programming an industrial process transmitter. (Title). A method is disclosed for altering in the field the operating instructions used by an industrial process transmitter to collect, manipulate and transmit output signals representing the state of an industrial process using a configuration device. (Abstract, emphasis added).

The industrial control system claimed in independent claim 1 of the subject application comprises an aggregation component associated with an industrial controller and a communications component. The aggregation component aggregates "one or more selected data items into an aggregated subset of data items" and is defined and installed by an entity remote from the controller. The communications component transmits the subset of data items via a singular communications packet across a network.

Applicants' representative respectfully submits that Gallagher does not teach, suggest or make obvious an industrial controller having an aggregation component that is defined and installed by an entity remote from the controller as required by independent claim 1 of the subject application. Additionally, Gallagher does not teach, suggest or make obvious aggregation of one or more selected items into an aggregated subset of data



10/092,323

02SW049

items transmitted *via* a singular communications packet across a network as required by independent claim 1 of the subject application.

Next, the method to facilitate data communications with an industrial controller as claimed in independent claim 21 of the subject application includes requesting tag information from a controller, building an object from the tag information provided by the controller, installing the object on the controller, updating object data on the controller, and, receiving data from the object that has been updated by the controller. Gallagher does not teach, suggest or make obvious building an object from tag information provided by a controller, installing the object on the controller, updating object data on the controller and/or receiving data from the object that has been updated by the controller.

Independent claim 31 of the subject application is directed to a system to facilitate data communications with an industrial controller similar to the method claimed in independent claim 21. The system includes means for requesting tag identifiers from a controller, means for constructing an optimized data packet from the tag identifiers requested from the controller, means for installing the optimized data packet on the controller, means for refreshing the optimized data packet on the controller, and, means for transmitting data from the optimized data packet that has been refreshed by the controller. Gallagher does not teach, suggest or make obvious a system comprising means for requesting tag identifiers, means for constructing an optimized data packet from the tag identifiers, means for installing the optimized data packet, means for refreshing the optimized data packet and/or means for transmitting data from the optimized data packet.

A signal to facilitate communications between a client application and an industrial controller is claimed in independent claim 32 of the subject application. The signal includes a data packet including aggregated information relating to one or more data items in an industrial controller, the one or more data items including tag and value information generated from an object installed on the controller, the aggregated information transmitted via a singular communications packet to mitigate transmission of superfluous network data. Gallagher does not teach, suggest or make obvious a signal to facilitate communications between a client application and an industrial controller, the

10/092,323

02SW049

signal including a data packet including aggregated information relating to data item(s), the data item(s) generated from an object installed on the controller, the aggregated information transmitted via a singular communications packet.

Finally, the industrial controller claimed in independent claim 33 of the subject application includes a first component that processes information received from a remote entity, an aggregation component that employs the information in connection with aggregating one or more selected data items into an aggregated subset of data items, the aggregation component defined and installed by an entity remote from the industrial controller, and, a communications component adapted to transmit the subset of data items via a singular communications packet across a network. Gallagher does not teach, suggest or make obvious an industrial controller that includes an aggregation component defined and installed by an entity remote from the industrial controller that employs information in connection with aggregating data item(s) into an aggregated subset of data items, the subset of data item(s) transmitted *via* a singular communications packet.

V. US 6,651,110 (11-18-2003) Caspers et al.

US 6,651,110 (Caspers) relates to a configurable object for industrial control and monitoring networks. (Title). A dedicated memory object for networked, programmable electrical components is designed to be embedded in the components to receive system and component-specific data. (Abstract, emphasis added). The memory object may be initially programmed *via* a network and subsequently reprogrammed as the system is modified or designations changed. (Abstract). The memory object can be programmed *via* a temporary or permanent data network connection such as from a remote location. (Col. 1, 54-57). The memory object includes dedicated memory segments or sectors provided in pre-established blocks which can be designed into components. (Col. 1, lines 49 – 52).

Independent claim 1 of the subject application is directed to an industrial control system comprising an aggregation component associated with an industrial controller and a communications component. The aggregation component aggregates “one or more selected data items into an aggregated subset of data items”. The aggregation component is defined and installed by an entity remote from the controller. The communications

10/092,323

02SW049

component transmits the subset of data items *via* a singular communications packet across a network.

Applicants' representative respectfully submits that Caspers does not teach, suggest or make obvious an industrial controller having an aggregation component that is defined and installed by an entity remote from the controller as required by independent claim 1 of the present application. Further, Caspers does not teach, suggest or make obvious aggregation of one or more selected items into an aggregated subset of data items transmitted *via* a singular communications packet across a network as required by independent claim 1 of the present application.

Next, independent claim 21 relates to a method to facilitate data communications with an industrial controller. The method includes requesting tag information from a controller, building an object from the tag information provided by the controller, installing the object on the controller, updating object data on the controller, and, receiving data from the object that has been updated by the controller. Caspers does not teach, suggest or make obvious building an object from tag information provided by a controller, installing the object on the controller, updating object data on the controller and/or receiving data from the object that has been updated by the controller.

Independent claim 31 is directed to a system to facilitate data communications with an industrial controller similar to the method claimed in independent claim 21. The system includes means for requesting tag identifiers from a controller, means for constructing an optimized data packet from the tag identifiers requested from the controller, means for installing the optimized data packet on the controller, means for refreshing the optimized data packet on the controller, and, means for transmitting data from the optimized data packet that has been refreshed by the controller. Caspers does not teach, suggest or make obvious a system comprising means for requesting tag identifiers, means for constructing an optimized data packet from the tag identifiers, means for installing the optimized data packet, means for refreshing the optimized data packet and/or means for transmitting data from the optimized data packet.

Independent claim 32 relates to a signal to facilitate communications between a client application and an industrial controller. The signal includes a data packet including aggregated information relating to one or more data items in an industrial controller, the

10/092,323

02SW049

one or more data items including tag and value information generated from an object installed on the controller, the aggregated information transmitted *via* a singular communications packet to mitigate transmission of superfluous network data. Caspers does not teach, suggest or make obvious a signal to facilitate communications between a client application and an industrial controller, the signal including a data packet including aggregated information relating to data item(s), the data item(s) generated from an object installed on the controller, the aggregated information transmitted via a singular communications packet.

Further, independent claim 33 is directed to an industrial controller that industrial controller includes a first component that processes information received from a remote entity, an aggregation component that employs the information in connection with aggregating one or more selected data items into an aggregated subset of data items, and, a communications component adapted to transmit the subset of data items via a singular communications packet across a network. Caspers does not teach, suggest or make obvious an industrial controller that includes an aggregation component that employs information in connection with aggregating data item(s) into an aggregated subset of data items, the subset of data item(s) transmitted *via* a singular communications packet.

### Conclusion

Applicants' representative respectfully submits that the subject invention as claimed is patentable over each of these references individually and/or in combination. The present application is believed to be condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 (Ref. No. ALBRP284US).

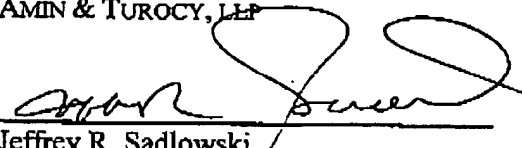
10/092,323

02SW049

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,

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